As the Author alledges this Example to fortifie his Opinion concerning the Cauſe that impells the Chyle to the Breaſts, which he takes to be the Mother's or Nurſe's ſtrong imagination and paſſion to give Suck; ſo he adds another, for the ſame purpoſe, known to himſelf, and happen'd in his own Family, which is, That a little Boy of his having been ſuckled for a while by his own Mother, the Author's Wife; but being fallen very Sick, and for great weakneſs unable to Suck any more for ſix or ſeven Weeks, and conſequently given over for Dead; the Mother, having caſt off all hopes of giving it any further Suck, let her Milk dry up. But the Child by great Care recovering ſo far as to be able to Suck again, and being put to an hired Nurſe, after the Mother's Breaſts were dryed up, and this Nurſe not uſing the Child well, the Mother out of great Compaſſion to her Child, did, about the End of the ninth Month from the time of her being brought to Bed, take the Babe to her ſelf again, and whilſt another Nurſe was looked for, with a thouſand embraces ſhe paſſionately wiſh'd and deſired, ſhe might have a full Breaſt to give Suck again her ſelf. A Nurſe being found the ſame Day, and the Child put to her Breaſts, the Wife of our Author found at Night, from her ſtrong imagination and paſſion (ſaith he) that her Breaſts, though not ſtroaked by her, nor ſucked by the Child, ſwell'd again, after they had for eight whole Months been quite dryed up, and they yielded ſo much good Milk, that, if the new Nurſe had not been hired, ſhe could have given plentiful Suck to the Boy her ſelf.

An Accompt of two Books.

I. *Tractatus quinque Phyſico-Medici, de SALE-NITRO & SPIRITU NITRO-AEREO; de RESPIRATIONE; de* RESPIRATIONE *FÆTUS in UTERO & OVO; de* MOTU *MUSCULARI & SPIRITIBUS ANIMALIBUS; de RACHITIDE: Auth.* Joh. Mayow, *LL.* D. *& Medici, &c.* Oxonii, *é Theat.* Sheldoniano 1674, *in* 8°.

THE *firſt* Treatiſe of this Book handling of *Niter*, and the *Nitro-aerial Spirit*, premiſeth a *Hiſtory* of *Niter*, and concerning it teaches; What are its component Parts; How

it

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it is produced in the Earth; What the Air contributes to its Generation, and what the *Earth* it ſelf: Which laſt he eſteems to be made of a fix'd Salt and Sulphur cloſely combin'd, and to contain the *Seeds* of fix'd Salts, even when elixiviated; which Seeds *he ſaith*, are by an Aerial Influx and Ferment in tract of time Digeſted and Matur'd into a fix'd Salt.

Having deliver'd the conſtitutive Principles of Niter in general, the Author treats in particular of the *Acid Spirit* of Niter, affirming it to be produced partly by the Air, and partly by a Terreſtrial Matter. Where he refers the Reader to thoſe *Boylean* Experiments, [*] which make it out, that the Air furniſhes ſomething that is, neceſſary to make a Flame: Which done, he teaches, that in *Niter* there do reſide *Igneous Particles* of the Air, which conſtitute its moſt active Part, and by which the flame of kindled Niter is produced, without any Sulphur, which Subſtance he will not at all admit to be found in pure Niter, being of Opinion, that the deflagration of Niter is made, not by any Sulphureous Parts of its own, (of which he ſaith it has none,) but by thoſe Fiery Aerial Parts, put into a very quick Motion. Concluding upon the whole Matter, that the *Aerial* Parts of Niter are nothing elſe but the *igneo-aerial* Particles thereof, requiſite to make Flame, and that this Aerial Part of Niter is lodged in the *Acid* [*] *Spirit* of the ſame, and not in the fixed Salt; which Acid Spirit, in his Opinion, is compounded of a *Terren* Matter, that is flexile and humid, and of *Ethereal* Corpuſcles, that are Rigid, Dry, Active and Igneous, proceeding from the Air. And theſe Igneous Particles, conceived by him to be *common* to *Niter* and *Air*, he calls *Nitro-aerial*, from whence the *Spirit of Niter* derives its cauſtique and corroſive Nature, which he calls a *Potential* fire, and from whence he thinks alſo that the *Form* or *Fire* chiefly, if not only, depends. Now, foraſmuch as this *Nitro-aerial* igneous

[*] *See Mr.* Boyle'*s excellent Tracts printed A.* 1672. *in* London; *the firſt of which contains* New Experiments touching the Relation between Flame and Air, and about Exploſitions; *where, among many other Things, is evinced the Efficacy of the Air in the Production of Flame even without any actually flaming or burning Body: and where alſo the Curious Reader will meet with a full and very inſtructive Account of thoſe Experiments, which this Author here Glances at.*

[*] Compare *Experimenta & Meditationes circa Naturalium rerum principia Davidis von der Becke,* deſcribed *N.* 103. of theſe Tracts, *p.* 61.

Spirit reſides in the *Acid* Spirit of Niter, he hence infers, that that *Nitro-aerial* Spirit is of a Nitro-ſalin Nature, obtaining rather the Nature of an *Acid* than *fix'd Salt*; conſidering alſo, that the Effects of Fire anſwer to a very ſubtile and corroſive Salt.

Theſe things being thus by our Author preſuppos'd, he deſcends to the Explication of the Nature of *Fire*, and makes its Form and Eſſence principally to depend from the ſaid Nitro-aerial Spirit put into Motion; rejecting the Opinion of thoſe, that will have Fire producible by the ſubtile and briskly mov'd Parts of *any* Matter, and declaring on this Occaſion his diſſent from thoſe Philoſophers, that deduce all Effects of Nature from the ſame Uniform Matter, and the various Modifications thereof; * which he thinks inconſiſtent with the *Phænomena* of Fire, not at all, *in his Opinion*, producible but by a certain determinate Kind of Particles, ſuch as he calls *Nitro-aerial*. This he endeavours to prove by divers Experiments.

Having done with the *Aerial* Part of the Spirit of Niter, he proceeds to its *Terreſtrial* and *Acid* Part, and labours to ſhew, How the Spirit of Niter is produced in the *Earth*. For the better underſtanding whereof he premiſes ſomething concerning the *Spirit of Sulphur* and other *Acid* Liquors; teaching, that that Spirit does not exiſt in Sulphur before deflagration or the Operation of the Fire; and affirming, that, *as* the *Nitro-aerial Spirit* of the Fire, by a very brisk Motion and Efferveſcence contending with and acting upon the *Salino-ſulphureous* Particles, does in a very ſhort time comminute and render Fluid the Salin Parts included in the Sulphureous; *ſo* the ſame Spirit, Boyling up by a more remiſs Motion with the ſame Salino-ſulphureous Parts, doth in a longer time turn the Salin Parts into an *Acid* Liquor. Where he takes Occaſion to Diſcourſe, How Liquors in general become *Acid* by the Operation of the Nitro-aerial Spirit; as alſo, Wherein Fermentation conſiſts, *viz.* In the Efferveſcence of the Nitro-aerial Particles with the Salino-ſulphureous ones of the Liquor.

This being explain'd, he thinks it not difficult to underſtand, How the *Acid* Spirit of the *Niter* is generated in the *Earth*; declaring,

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* *Compare herewith the Conſiderations of the Noble* R. Boyle *about the* Excellency and Grounds of the Mechanical Hypotheſis, *printed at* London *this preſent Year* 1674.

ring, That *as* the Nitro-aerial Spirit, put into a vehement effervеſcence with the Particles of common Sulphur, doth ſooner or later evacuate and make Fluid the Salino-metallic Parts thereof; *ſo* the ſame Spirit penetrating into the Bowels of the Earth, falls there upon the Terreſtrial Sulphur, and therewith Fermenting, ſo breaks and attenuates the Salin Parts harbour'd therein, that at length they become Flexil, Liquid, and highly Acid; and theſe Salin Parts being thus reduced to Fluidity, become a fit receptacle for the Nitro-aerial ones to lodge in; from the ſtrict union of both which he affirms ſuch a Spirit of Niter to be conſtituted, as is obtain'd by Diſtillation. And theſe Particles of the Nitrous Spirit being thus generated in the Earth, meeting with the Seeds of fixed Salt, harbour'd in the Earth, do quickly embrace the ſame, and being cloſely combin'd with them, make up that Salt called *Niter*. So that, according to this Author, *Sal-Niter* is made up of a threefold Salt; whereof one the moſt Active, deduces its origin from the Air, and is of an Ethereal and Igneous Nature; and this by its Architectonical power forms to it ſelf out of a Terreſtrial Matter a Salin Vehicle, which, together with the Igneous Salt reſiding in it, conſtitutes the Spirit of Niter, which as ſoon as it is Generated falls a working upon the fixed Salts of the Earth brought to due maturity, and together with them makes up the *Common Niter*. From this *Nitro-aerial Spirit* he derives all *Fermentations* tending both to the Production and Diſſolution of Things. From the ſame he deduces *Rigidity*, and particularly *Congelation*, and the Expanſion made therein; where he examines the explication given by *Des-Cartes* of the Rarefaction of congealed Water. And as he makes Rigidity the Effect of that Spirit, ſo he would have the Reſtitution of Rigid and Infected Bodies, in which conſiſts *Springineſs*, to reſult from the ſame. And acknowledging, from the many *Boylean* Experiments, * that the Air is endow'd with a conſiderable Spring, he attempts to give an Account, whence that Elaſtique power ariſeth; taking it for granted, that the Air, contains ſtore of thoſe Nitro-aerial Particles, that to him are abſolutely neceſſary to make Fire, of which the Air being exhauſted by Deflagration, the Fire needs muſt be extinguiſh'd; and aſſuming thereupon, that the *Elaſticity* of the *Air* proceeds from ſuch Aerial Particles as maintain Flame; having found, *as he ſaith*, by Experiments, that Air deprived of thoſe Nitro-aerial Parts looſeth its Springy Vertue; which Vertue he alſo affirms to be leſſened by the *Reſpiration* of Animals, who, in his Opinion, do exhauſt out of the Air certain Vital, and thoſe Elaſtique, Particles; inſomuch, that he doubts not but that ſomething Aerial, abſolutely neceſſary to Life, paſſeth into the Blood of Animals by means of their Reſpiration; whoſe Neceſſity therefore he cannot acknowledge to ariſe from thence only, that thereby and by the Motion of the Lungs the Maſs of Blood may be communicated, as ſome have aſſerted: Concluding at laſt, that *Fire* and *Life* are maintain'd by the ſame Aerial Parts; and giving a Reaſon, why an *Animal* is able to live in a Receiver a while after a *Candle* is extinguiſh'd; which is, that, *in his Opinion*, there is required a greater Quantity of Aerial Particles to the burning of a *Candle*, than the maintaining of *Life*. Whence yet he would by no means have it infer'd, that, though Flame an Life are maintain'd by the ſame Particles, therefore the Maſs of Blood is *kindled*, as ſome teach: Which Doctrine how ſolidly our Author diſputes againſt, we leave to thoſe that are concern'd to examine.

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* *To be met with in Mr.* Boyle's *Phyſico-Mechanical Experiments of the Year* 1660. *at* Oxford; *and the Continuation of the Year* 1669. *at* Oxford; *where the conſidering Reader may find a full information of what our Author here declares.*

Mean time, finding great Difficulties in this Matter of *Springineſs*, he conſiders, by what ways the Elaſtique Vertue of Things may ariſe; where he concludes, that though it may partly proceed from the Agitation of the Aerial Parts by a ſubtile Matter interſpers'd amongſt them; yet it ſeems to him, that the Spring of the Air doth chiefly proceed from, and conſiſt in this, That the rigid Parts of the Air, being compreſt by the Weight of the incumbent Atmoſphere, and thereby inflected, do endeavour to expand themſelves.

Next, he attempts to explain, How the Air comes to looſe its Spring in *Flame*; affirming, that foraſmuch as the Rigidity of the *Ramous* Parts of the Air proceeds from the *Nitro-aerial* corpuſcles therein infixed, and the Spring from that Rigidity, therefore the *former* Parts of the Air being depriv'd of the *latter*, they not only become unfit to maintain the Fire, but alſo

from

from rigid become flexile, and conſequently looſe their Spring.

Here he takes occaſion to deliver his Thoughts again of the Nature of *Fire*, which ſeems to him to be nothing elſe, than a *Congeries* of very minute Sparks copiouſly ſtruck out of the Aerial parts by the alliſion of the Sulphureous ones ; eſteeming the Aerial parts ſolid and rigid enough, to have Fire ſtruck out of them.

This done, he further declares, that the Nitro-aerial Particles, from which, *in his Opinion*, the Spring of the Air proceeds, are lodged in the very Parts of the Air, and carried away from it by the Burning of a Candle, or the Reſpiration of Animals ; ſo that, *to him*, thoſe Nitro-aerial and Elaſtique parts, that come to fail, are not the Air it ſelf, but the ſubtileſt and the moſt active Part thereof, which being expell'd by burning or reſpiration, the Air becomes effete, and deſtitute of its Spring.

Moreover, he conſiders, How the Air, when deprived of its Nitro-aerial parts, is afreſh ſupplied with them ? Likewiſe, he takes occaſion to declare his Opinion, firſt, of the Nature of the *Sun*, viz. That it ſeems to be nothing elſe than a vaſt *Chaos* of Nitro-aerial corpuſcles, wheeled about by a perpetual and very ſoft rotation ; ſecondly, of the Nature of *Cold*, that it is ſomething *Poſitive*, conſiſting in this, That the Nitro-aerial parts, which being vehemently mov'd conſtitute the Body of the Sun, when remov'd from the Sun into the Middle-Region of the Air, ceaſe from that Motion of Circumgiration, and either totally ceaſe, or move on *punctim* like ſo many Briſtles or Darts.

Further, he obſerves, That ſince the Parts of the Air being deprived of the Nitro-aerial Spirit are raiſed upward, and being there impregnated afreſh, return thence downward again ; therefore the Air being the Blood as it were of the *Macrocoſm*, is in a continual Circulation, and doth it ſelf, foraſmuch as in Circulating it takes in the Nitro-aerial Spirit, exerciſe a Kind of Reſpiration.

Hereupon he proceeds to explain, In what manner the Nitro-aerial Spirit is breathed in by Animals ; and how it comes to looſe in them its Elaſtique Power ; and of what uſe it is being inſpired : where he teacheth, That thoſe Nitro-aerial Parts are in Animals as well as in Vegitables the principal Inſtrument of

Life and Motion ; and that the Fermentation both of the Blood and the Vegetable Juice depends on the ſame.

Then he paſſes on to deliver his Opinion about the *Flamma vitalis*, eſteeming, that the Fermentation of the Blood, and conſequently the Incaleſcence of it, ariſeth from its Nitro-aerial Parts boyling up with the Salino-ſulphureous ones, without a neceſſity of having any recourſe to ſuch a Flame ; which he doth ſomewhat ſarcaſtically Exagitate, thereby provoking the Maintainers thereof to a Vindication, if the Matter will bear it.

This done, he enquires, Whether Air may be generated *de novo*, and, on this Occaſion, recites an Experiment, which he ſaith, is like to one formerly made by Mr. *Boyle*, tending to prove the *Affirmative* of the Queſtion. Concerning which, this Author is of Opinion, that though the *Aura*, produced by that Experiment, and by others here recited, be endow'd with a no leſs Spring than the Air we breath in ; yet it is no *true* Air, ſuch as contains vital and igneous Parts ; for as much as that *aura*, wherein he found an Animal and a lighted Candle to exſpire; was, *as he ſaith*, endow'd with a Spring as well as an unviolated Ait, but deſtitute of Nitro-aerial and vital Parts. Mean time, he ſuggeſts an Experiment to diſcover, Whether the pretended new generated Air be true Air indeed and fit for to maintain any Life ; and by that Experiment determines this Matter in the *Negative*, though he denies not that there is a great Affinity betwixt them.

After this, he ſpends a *Chapter* in diſcourſing, How *Fire* is kindled and propagated, and in what manner all *Fermentations* are made, namely, by the pulſatian of the Carteſian *materia ſubtilis*, whereby as by a Subſtance that conſtantly moves, *he ſaith*, the Ignited Parts are put into a vehement Motion. And here he declares, That *Fire* ſeems to him to be nothing elſe than a very great Fermentation of Nitro-aerial and Sulphureous Parts ; and concludes, That, as the moſt vehement Motion of the igneous Particles proceeds from thence, that the Sulphureous ones paſs into the Particles of the Niter or Air, and there hitting upon the briskly agitated *materia ſubtilis*, are by the impulſe of the ſame, together with the Nitro-aerial Parts, found in the ſaid Subſtances, by an Elaſtique impetus ſtruck out ; ſo all the more remiſs

Fermentations of natural Things are cauſed hence, that the ſaid Nitro-aerial Particles, penetrating the Salino-ſulphureous Maſs, do enter into the Body of the *Subtile matter*, by which, being put in a great Agitation, the ſaid Nitro-aerial Parts are protruded together with the Sulphureous ones ; ſo that the Efferveſcence of Fire ſeems to him to differ from the more remiſs Inteſtine Motions, by which Vegetables are generated or diſſolved, only in this ; That in Fire the Nitro-aerial Particles being cloſely joyn'd with the fixed Salts or Parts of the Air, are by the impuſe of the ſulphureous Parts and the ſubtil Matter carried away with Violence, and put in a very ſwift Agitation ; whereas in other Fermentations, the ſulphureous Parts not being lodged ſo faſt in the embraces of the fixed Salt, are by the pulſation of the Nitro-aerial Parts and of the *materia ſubtilis* moved with more remiſſneſs.

Having diſpatch'd this Argument, he maketh an excurſion into the Ocean, and labours to give an Account of that Aſcent of the Waters in the Sea, which is commonly call'd a *Spout* ; deducting it from a vehement *Vertigo* or Whirling of the Air : of the Particulars thereof himſelf may be conſulted.

Next, he Diſcourſes of *Light* and *Colours*, embracing the Doctrine of *Des-Cartes*, making *Light* to conſiſt in a pulſe, which by reaſon of the continuity of the luminous *Medium* is ſuddenly tranſmitted to the greater Diſtance ; but this Impulſe our Author would have made by his Nitro-aerial Particles ; as he is of Opinion, That *Colours* are produc'd not from a light Reflected, but from a peculiar Impulſe of the *Medium*, altogether different from that of Light ; concerning which and the manner of which, the Diſcourſe it ſelf may likewiſe be peruſed.

To this he ſubjoyns a *Chapter* about *Lightning*, which he denies to proceed from kindled Exhalations ; and having eſpouſed the *Carteſian* Opinion of the Production of *Thunder* from the impetuous fall of the upper condenſed and conglaciated Clouds upon the lower ; he hence infers, That *Lightning* is made by his Nitro-aerial Particles ſtruck out of the Air, and by their vehement igneous Motion, cauſing a ſlight and momentaneous Flaſh ſpreading it ſelf over the whole Hemiſphere. Where he adds his Thoughts about the Force of Lightning, and its wonderful Effects, in melting Swords without hurting their Scabards, in killing Animals, in occaſioning very tempeſtuous Winds, *&c.*

This is follow'd by an Explication of the Manner, How Heat is raiſed in *Quick-lime* by pouring Water upon it; which he deduces from two contrary Salts, the Acid and Alcali, working upon one another: So that ſlaked Lime ſeems to him to be nothing elſe but a Magiſtery conſtituted by two contrary Salts, and a ſtony Earth united together. Where he adds the reaſon, Why Quicklime is not Heated by the affuſion of well-rectified Spirit of Wine, or of Spirit of Turpentine, or any other ſulphureous Liquor; *viz.* becauſe ſuch Liquors are unfit to diſſolve the Salts contain'd in the Lime. To which he ſubjoyns, a Diſcourſe about the *Convening of contrary Salts* both with themſelves, and with other Things; as alſo concerning *Precipitation*; giving withal a caution, not raſhly to preſcribe contrary Salts in the ſame Medicine, leſt the one deſtroy the efficacy of the other, or change it into a third, quite different from what it was before.

After this, he makes a Digreſſion to examine the *Bath-Waters*; judging them to be impregnated with a Kind of Vitriolat Tartar, or an aluminous Salt; which Salts yet, *he ſaith*, do not deſtroy one another, but either of them falls into an efferveſcence with its contrary, for as much as thoſe Salts are ſo imperfect, that joyned together they are not able to deſtroy one another. So that he denyeth there is any Solution either of *Niter* or *Sulphur* in thoſe Waters, as hath been hitherto believed; declaring it to be a Cheat, that *Silver Coins* immerſed in thoſe Waters are tinged *Yellow*; for as much as they are rather tinged *Black*, if immediately they be put into them without any previous dawbing them with a ſalino-ſulphureous Dung. Nor will he admit theſe Waters to be Heated by any ſubterraneal Fire, but with the learned *Jordan* aſſerts, that Heat to be produced by a Fermentation made in the Bowels of the Earth: To explain which, he deſcends no conſider the *Origin* of *Fountains*, moſt of which he conceives, with many others, to have their riſe from Rain-waters, and not from the Sea; which being ſuppoſed, he aſſerts, that the Air and the Rain-waters paſſing deep into the porous

Earth, and there meeting with Salino-ſulphureous Mines, do excite therein a very intenſe Heat, and that the Springs flowing forth from Mines thus Heated, conſtitutes theſe Hot-Baths.

So much, if not too much, of the *firſt* Treatiſe. Of the other *four*, there are *two*, *viz.* that of *Reſpiration*, and the *Rickets*, the former of which having been Publiſh'd once already, we have given an Account thereof in *Num.* 70. of the Tracts; ſo that, for fear of being too Prolix, we muſt ſay no more of it here; as we alſo ſhall forbear to diſcourſe of that other of the *Rickets*; but to haſten to make ſome mention of the two remaining Parts, treating of the *Reſpiration* of a *Fœtus in the Womb* and *the Egg*, and of the *Muſcular Motion* and the *Animal Spirits*.

Touching the *former* of theſe, our Author conſidering with himſelf, How a *fœtus* can live in the Womb without the acceſs of Air, and finding the Offices hitherto Aſſigned to the *Umbilical Arteries* to be ill grounded, ſcruples not to affirm with the learned *Everard*, that the ſaid Arteries are formed chiefly, if not only, for the Uſe of *Reſpiration*, declaring, That the Blood of the *Embryo*, being convey'd through the Umbilical Arteries to the *placenta uteri*, carries to the *fœtus*, not only the nutritious Juice, but alſo with it a quantity of the Nitro-aerial Particles, whereby the Blood of the *fœtus*, by its Circulation through the Umbilical Veſſels, is impregnated juſt as it is in the Veſſels of the Lungs: Whence he would not have that *Placenta* call'd any more the *Liver* but the *Lungs* of the Womb. And this Supplement for Reſpiration he extends to the Chicken in an *Egg*, aſſerting, that the ſame doth no otherwiſe than a Child in the Womb breath by the ſaid Arteries; eſteeming, that the primogenial Liquors of the Egg, furniſh'd with a pure aerial Subſtance, being inceſſantly convey'd through the umbilical Veſſels to the Chick, perform to the ſame the Office not only of Nutrition, but of Reſpiration alſo. To this he adds, that even that gentle Warmth, excited in the Egg by Incubation, may alſo contribute ſomething, there to ſupply the defect of Reſpiration: foraſmuch as he ſuppoſes to have proved in his Treatiſe of *Reſpiration in general*, that the Nitro-aerial Particles, by the Bloods fermentation ſtruck out of the Parts of the Air, ſerve Animals for Reſpiration; and that, as all Heat proceeds, *in his*

Opinion, from ſuch Nitro-aerial Particles put into Motion, ſo in this caſe, the Heat given by the incubating Bird, and received and detained in the *Albumen*, is thence collected by the many ſmall Suckers of the Umbilical Veſſels, and ſo conveyed to the Chicken. Upon which ground he undertakes to ſolve that difficult *Quære*, viz. *Why a Fœtus after it is born and yet cloſed up in its Membrans, may yet live for ſome Hours; whereas, if being deveſted of thoſe Skins, it have once taken Air into its Lungs, it cannot live a Moment after without it?* Which he anſwers thus; That a *Fœtus* born, and yet wrapped cloſe within the Membrans, is in a like State, and Breaths much after the ſame manner as a Chick included in an Egg. But, if thoſe Membrans being pull'd away from the *Fœtus*, it do, for Breathing, with *labour* contract the Muſcles of the Cheſt and the Midriff, it ſpends in that muſcular Labour much more of thoſe Nitro-aerial Parts than before; whence there is a greater Neceſſity for the *Fœtus* to breath in the open Air, there being now nothing to compenſate the defect of that Reſpiration.

But enough alſo of this Exercitation; let us paſs to the laſt, which is of *Muſcular Motion*, and *Animal Spirits*. It is undoubted, that the Motion of Animals is made by the Contraction of the Muſcles; but it is controverted, in what manner that Contraction is made? The moſt received Opinion is, That the Fibres of the Muſcles are inflated by ſome Elaſtique Matter, ſwelling them as to their breadth, but contracting them as to their length; though the learned *Steno* in his *Myology*, thinks it needleſs to take in a ſpringy Matter for the Contraction of the Muſcles; foraſmuch as he judges it may be effected by the ſole Change of their Figure. Concerning which our Author conſiders, that it appears not; 1. How that Motion, requiſite to make a Change in the Figure, can be produc'd without the Acceſſion of ſome new Matter. 2. How it comes to paſs, if no new Matter enters the Muſcle, that in its Contraction it is ſo ſenſibly hard and tenſe? And whereas Anatomiſts have hitherto taught, that the Carneous Fibres chiefly make the Contraction in Muſcles, our Author thinks it more probable, that the *Fibrillæ*, tranſverſly inſerted into the greater *Fibres*, perform the chief Part in that Contraction, by reaſon as well of their poſition, as their ſize and number. And as to the Cauſe of this Contraction in theſe *Fibrillæ*, he thinks, that, beſides the *Animal Spirits*, there are alſo required to this Motion ſome of the ſalino-ſulphureous Parts of the Blood; and that thoſe *Animal* Spirits, that contribute to the animal Motion, conſiſt of thoſe Nitro-aerial Parts, which he aſſerts to be tranſmitted into the Blood by Inſpiration. And both theſe Parts he judges neceſſary to this Muſcular Motion, becauſe he underſtands not, how that Animal Motion can be perform'd without different Particles mixed together and briskly moved; in regard that, *in his Opinion*, it cannot be effected by Springineſs and Weight, which do the work in *Automatums*, ſince their *impetus* will ſoon ceaſe: Whence he concludes, that the Muſcular contraction is perform'd by the Efferveſcence of the Salino-ſulphureous and Nitro-aerial Particles; of which two he endeavours to ſhew the *later* to conſtitute the very Animal Spirits, proceeding from the Brain in ſuch Animals as commonly are call'd *perfect*, and (according to *Malpighius*) from the *Medulla ſpinalis* in *Inſects*. But, though our Author aſcribes ſo much to the *Nitro-aerial Particles* as to make them the ſame with the *Animal Spirits*; yet would he not have us think, that he believes the *Senſitive Soul* to conſiſt in a *Congeries* of Animal Spirits, ſince he conceives that Soul to be a thing different from them, and to conſiſt of a Matter yet more ſubtil and æthereal; of which thoſe Nitro-aerial Particles, that is, the Animal Spirits, are the inſtrument of operation. And concerning that *Senſitive Soul* he thus declares his Mind, *viz.* That it is a more divine *aura*, endow'd with ſenſe from its firſt Creation, and coextended to the whole World; a ſmall Portion of which being contain'd in a duly diſpoſed Subject, exerts ſuch Functions, as we ſee and admire in the Bodies of Animals.

Having diſpatch'd this *Hypotheſis* about the Nature of Animal Spirits, he endeavours to explain from thence the manner of all Fermentations and Concoctions perform'd in the *viſcera* of Animals, and particularly in the *Stomach*, *Pancreas*, and *Spleen*; in the laſt of which he takes Occaſion to ſhew, *both* how the Fixed Salts in Animals are volatiliz'd, *and* that from Plants, (which he ſaith are furniſh'd with no Volatil Salt) if they be laid to putrify, a conſiderable Quantity of Volatil

Salt may be extracted by Diſtillation*.

He concludeth this Part by ſhewing, 1. In what manner the *Fibrillæ* of the Muſcles are contracted; namely, not by Inflation, but Contorſion, as very conſentaneous to the conſtriction and hardneſs of contracted Muſcles, as well as to that ſtrong Traction of the Muſcles, ſometimes perform'd with a wonderful Vigour; to which he adds, the fitneſs of the Motion of the Nitro-aerial Particles (by which the Muſcular contraction is, *in his ſentiment*, perform'd) for ſuch a Contorſion; enforced by Experiment. 2. How the Muſcles themſelves are mov'd; *viz.* not by bringing the Extremities of the ſhortned Fibres to the Middle, but by drawing the looſer End and the middle Part of the contracted Fibres to the faſtned End, or to the Head of the Muſcle, which is a fixed and immoveable Tendon. 3. How the Diaphragme, and the Heart are contracted; and how *Saltation* is perform'd. But apprehending we have already been too tedious in giving this Account, we muſt here break off, and in theſe and ſome other Particulars refer to the Author himſelf.

II. *ANATOME CORPORIS HUMANI, conſcripta ab* Isbrando de Diemerbroeck, *Med. & Anatomes Profeſſore, Ultrajecti,* 1671 *in* 4°.

THIS Comprehenſive Body of *Anatomy*, but lately come to my Hands, conſiſts of 12 Parts or Books: The *firſt*, *ſecond*, and *third*, treat of *Three Venters* of the Human Body, as they are wont to be call'd by Anatomiſts; the Author having premiſed thereunto ſome general Conſiderations touching the great diverſity to be met with therein, as to its outward Form, Size and Colour; where he takes particular Notice of the Obſervations, made *both* by *Schouten* in his Voyages, of having found about the *Straights of Magellan*, Men of ten and eleven Cubits High; *and* by *Fazellus* in his 1. *decad. lib.* 1. *c.* 6. of Men found, ſome 17, ſome 18, ſome 20, and even 22 Cubits Tall.

Treating of the Concoction made in the Stomach, he conſiders the Cauſe of *Chylification*, why the Aliments there are turned into Chyle rather than into Bile, Blood, *&c.* examining alſo the Opinions of Phyſicians concerning the Cauſe of *Hunger*, and ſubjoyning his own, illuſtrated by Hiſtories, ſhewing, That ſuch as have faſted for a Couple of Days are then not ſenſible of Hunger, and find no other Trouble but that of Feebleneſs of Body. He alſo he diſcuſſes three Problems. 1. What is the Cauſe of unnatural Appetite, call'd *Pica?* Which Cauſe he placeth rather in the Brain than the Stomach. 2. Whether in a depraved Conſtitution and Concoction of the Stomach, the Bile may be made in the ſame, ſuch as in the *Cholera morbus* is voided both upward and downward? Which he denyeth againſt *Regius*, and others. 3. Whether *all* the Chyle flows out of the Stomach into the Gut? Which he anſwers in the *Affirmative*, refuting thoſe that aſſert, part thereof to paſs by the *vas breve*, and other neighbouring *gaſtic* Veins, into the Spleen; and aſſigning the manner of the ſudden Refection of the Body after Eating and Drinking.

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* *Compare this with what the ingenious Dr.* Daniel Cox, *a Fellow of the* R. Society, *publiſh'd four Months ſince, in* Numb. 101. *of the* Philoſophical Tranſactions; *where it will appear, that that learned Gentleman hath ſet down the whole Proceſs of the* manner of this Extraction, known to him many Years ago, for which he deſerves due Acknowledgement.

This done, he Diſcourſes of the Uſe of the Chyle, and inquires, Whether any Parts of the Body are immediately nouriſh'd by the Chyle before its Converſion into Blood? Which he reſolves in the *Negative*; though he affirms withal, that whilſt the Blood is the ultimate Aliment of all the Parts, the Chyle doth humect the Stomach and the milky Veſſels.

Treating of the *Meſentery*, and the many and conſiderable Glanduls thereof, he obſerveth, that from the Obſtruction of thoſe Glanduls, Fluxes and Atrophies are frequently occaſioned; refuting withal the Opinion of *Riolan*, who makes the Glanduls of the Meſentery the root of all Strumoſity.

Examining the *Pancreas*, he reproveth thoſe that would deduce almoſt all the Origins and Cauſes of Diſeaſes, from the vitiated Humour of the *Pancreas*: Where he alſo rejects Dr. *Wharton*'s Opinion concerning the Uſe of this Part, *viz.* that into it are voided the excrementious Juices of the Nerves.

Searching into the *ductus thoracicus* (the Conveyer of the Chyle,) he declares, that that winding Circle of *De Bills*, into which he affirmed the ſaid *ductus* to be propagated at the place of the diviſion of the Jugular Veins, is not a Protraction of that *ductus*, nor receives from it any Chyle, nor carries any; but a Channel, in which is collected the *Lympha*, conveyed out of the circumjacent Glanduls and other Parts, and to be conveyed into the neighbouring Veins, *&c.* Here he alſo treats of that Queſtion, Whether through his *ductus* all the Chyle paſſeth to the ſubclavial Veſſel ? which he anſwers affirmatively, except that ſometimes, yet very ſeldom, and in an extraordinary Caſe it flows to the Bladder, and ordinarily in Women with Child to the Womb, and thoſe that give Suck, to the Breaſts. Refuting withal *Regius Deuſingius*, and others, that labour to maintain the contrary.

Inquiring into the *Lymphatic* Veſſels, he explodes the Aſſertion of the ſame *De Bills* ; teaching, that the *Lympha* is the ſelf ſame Liquor with the Chylous Juice contain'd in the Lacteals, and that it paſſeth out of the Chyliferous Veſſels into the Liver and Glanduls, and from thence into the Spermatic Veſſels for the Humectation and Nouriſhment, and not from the Glanduls and Liver to the Chyliferous Veſſels. Having diſpatch'd this Controverſy, he examines, What Kind of Liquor this *Lympha* is ? Where having endeavour'd to diſprove the Opinion of Dr. *Gliſſon*, eſteeming it to be made of the Steams of the Blood, collected like Dew, and impelled into theſe Veſſels, and repaſſing with the Vehicle of the Aliment carried through the Nerves; he aſſerts the *Lympha* to be a peculiar ſubtile Liquor, ſeparated in the conglobate Glanduls from the *Serum* of the Blood, and embued with ſtore of volatile Salt, and with ſome Sulphureous Particles, getting into thoſe ſmall Veſſels, and by them convey'd partly into the Chyliferous Veſſels, partly into many Veins ; into the *former*, the more to attenuate the Chyle and thereby to facilitate its Dilatation in the Heart ; into the *latter*, to prepare alſo the Venal Blood to a more expedit Rarefaction in the ſame Part. Before he leaves theſe Veſſels, he notes, That the Rupture of them often cauſeth the *Aſcites*, and that their being obſtructed occaſions other dangerous Diſeaſes.

In the Anatome of the *Liver*, he chiefly commends the accuracy and diligence of Dr. *Gliſſon* and Signor *Malpighi*, eſpecially as to the Poſition of the Branches of the *vena cava* and *porta*, and the Veſſels of the Bladder of Gall, and how the Blood of the *Porta* enters into the Roots of the *Cava* and thoſe of the ſaid Bladder, not by opening themſelves into one another, nor by

having

having their Branches inſerted into the Sides of one another, but only by ſending the ſanguineous Liquors through the Ends of the Ramifications of the *Porta* in the Subſtance of the Liver, and from thence conveying the ſaid Liquors into the extremities of the *cava* and the Veſſels of the Bladder of Gall : Where he alſo expreſſes his Agreement to the Aſſertion and ſolid Proof of the learned Dr. *Gliſſon*, importing, That in a Liver there is not any *Anaſtomoſiſs* of any Veſſels : Whence he concludes it to be evident, How that in other Parts alſo the Circulation of the Blood is perform'd not by the ſole *Anaſtomoſis* of the *Arteries* with the *Veins*, but by the very Pores of the Subſtance of the Parts themſelves. Further, having with moſt of the modern Anatomiſts deny'd *Sanguification* to be perform'd in the Liver, and aſcribed to it, and the Spleen together, the province of making the Ferment of the Blood, to render it ſpirituous ; he ſubjoyns two or three Obſervations of Perſons cured of conſiderable Wounds inflicted in the Liver ; and another of a Youth whoſe Liver was immediately joyned to his Lungs, without any other *diaphragme* or *mediaſtinum* at all ; as alſo of one *Ortelius*, that had neither Liver or Spleen, and whoſe *vena cava* proceeded out of the Guts themſelves; concerning which latter Caſe the ſagacious *Malpighi* conjectures, that the glandulous Subſtance of the Liver in the ſaid *Ortelius*, exended it ſelf all along his Guts.

In the examination of the Juice of *Gall* he obſerves, That that Liquor doth not only promote the excretion of the *Fæces*, but is alſo highly neceſſary to the Fermentation of the Chyle and Blood ; and teacheth, that it is a fermentative Juice prepared in the Liver out of the Sulphureous Parts of the Venal Blood, and the Saltiſh and Sub-acid Liquor of the Spleen ; refuting not only the new Opinion of *Sylvius* and *Regius* concerning the Generation of this Liquor ; but alſo that of *Malpighius*, importing, That the Bile is not generated out of any Blood, or by a Concoction of divers Juices made in the Liver, but only ſeparated from the Blood by means of the Kernels of the Liver. After this he diſcuſſes and diſproves the Doctrine of *Backius* and *Sylvius* about the Motion of the *Bile*, aſſerting it to be produced in the *folliculus*, and to paſs partly through the common *ductus colidochus* into the Guts, and partly through the *porus bilarius* into the Liver,

ver, there to mix with and to attenuate the Blood ; but that nothing of the Bile flows out of the Liver through the ſaid *porus* into the Guts.

In the diſquiſition of the *Spleen*, he highly applaudeth the diſcovery of the excellent *Malpighius*, who found it to be wholly made up of little membranous Cells like Hony-combs, accurately explained in his Diſſertation *de Liene c.* 5. and formerly deſcribed in theſe Tracts, *Numb.* 44. *p.* 890. As to its *Uſe*, he thinks that to be no other, than to make out of the arterial Blood a ſub-acid Matter, from which, being anew concocted with ſulphureous Particles in the Liver, is made a bilious Ferment of the Blood and Chyle. Entring here upon the Conſideration of the *Neceſſity* of the Spleen in the Body, and relating amongſt other Particulars, that it having been written out of *England*, that thoſe Bitches, of whom the Spleen had been cut out, had proved ſteril afterwards, Dr. *de Graef* had thereupon made himſelf an Experiment upon a Bitch, which having been deprived of her Spleen, had afterwards conceived and brought forth Puppies : Which Story is certainly grounded upon a Miſtake, foraſmuch as it is moſt notorious over all *London*, that, divers Years ſince, a Bitch, yet alive, of a conſiderable Nobleman, after ſhe had loſt her Spleen, hath been ſeveral times with Puppies, of which ſome, out of Curioſity, were opened, and found to have a very fair Spleen.

Our Author having explain'd the ſtructure and uſe of the *Pancreas*, the Liver, Bile, and Spleen ; ſpends a whole Chapter upon the Ferment of the Blood and Chyle, to which he judgeth, that the Operations of the Liver, Spleen and Pancreas do joyntly concur ; where he takes Occaſion to Diſcourſe largely of the Matter, Nature, Preparation, and Manner of working of Ferments ; and obſerves Particularly, from whence thoſe ſharp and fermentative Particles in our Bodies are derived ; adſcribing their origine to Sulphur and Salt, to be found in all Aliments ; the *former* cauſing the Commotion, and the *latter* the principal Acrimony. To all which he adds, the Inconveniencies and Diſeaſes ariſing in the Body, for want of the due Manner and competent Degree of Fermentation in the Juices thereof.

Next, our Author proceeds to the conſideration of the *Kid-*

neys, where, having rejected the Opinion of *Hieronymus Barbatus*, teaching, That the *Serum* is as alimentary to the Spermatique Parts, as the *Blood* is to the Carneous; he highly commends what Signor *Malpighi* hath detected in the Kidneys, *lib. de Renibus*, (of which ſee alſo *Numb.* 44. of theſe Tracts *p.* 890.) and Diſcourſes at large of the Manner of Separation of the *Serum* from the Blood, which, in his Opinion, is done by a peculiar Fermentation made in that Part; yet leaving it in the dark, How by that efferveſcence the ſerious Part of the Blood, together with many Impurities, is ſeparated, and what Configuration it requires, fit to paſs alone through the Pores of the Kidneys, with excluſion to the Blood? And, which is much more ſtrange, How divers ſolid and hard Bodies, as Needles, ſmall Nails, Fennil and Anni-ſeeds, *&c.* (of which here are alledged Examples well atteſted,) can be excreted with Urine, but without Blood: To render ſome tolerable Account of which *Phænomena*, as alſo, to conceive the better, How Spaw-waters can be in ſo great plenty Voided, without paſſing through the Heart, Lungs and Kidneys, and without moleſting the Heart; our Author ſuſpects, there are ſome Lacteous Veſſels, going ſome yet unknown Way to the Bladder and Womb; which Suſpition he confirms by this, That ſometimes a chylous milky Matter hath been ſeen voided with the Urine: By which Way he imagines alſo that thoſe Liquors do paſs, whoſe colour and ſcent do remain unchanged in the Wine: Of which Caſes he names ſeveral, not only of Oyl of Turpentine, and Aſparagus (which are commonly known to do ſo,) but alſo of a black Medicine, rendering black the Urine, ſoon made after; of Saffron given to a Women in Travel, and having tinged the Child born within a quarter of an Hour after; of ſome, that had eaten the roaſted Fat of *Lambs-Kidneys*, which by the Author himſelf was ſeen ſoon after to come almoſt alway with the Urine, *&c.*

Treating of the *Parts of Generation*; he animadverts upon *Veſlingius* and others, that teach the ſpermatique Veins and Arteries to terminate in the *Paraſtatæ*, and there to be changed into the *vaſa deferentia*, as Bodies continued to them; whereas he thinks it evident, That thoſe Veſſels do not enter into the *Paraſtatæ*, but the *Teſticles* themſelves; which *latter* being

Diſcourſed of by him, he not only alledges Examples of ſome, that had 3 *Teſtes* but alſo an Inſtance of one that was born without any at all, and yet acted the Part of Virility *in coitu*. Then he rejects the Opinion of thoſe, that hold a threefold *Semen*, elaborated in three different Parts, and neceſſary to Generation: He ſhews alſo, how caſtrated Animals may Engender; and yet how inconſequent it is, that becauſe ſome Animals deſtitute of Teſticles do Generate, therefore the *Teſtes* do not *conſicere ſemen*. Proceeding to the Female Sex, he inquires into the Nature of the *fermentum uterinum quod inducit menſtrua*; and examines, Whether a *Fœtus* may be formed *extra uterum*? Whether the *uterus* do remove from its place in hyſterical Women? How fætid Things do help in byſterical Fits? Whether a *Fœtus* can be born, the Mother being dead? *An mulierum genitalia ſolo ſitu a virorum genitalibus differant? An mulier mutari poſſit in virum?* What is the conſtituent Matter of the *Seed*? Whether any Thing beſides Arterial Blood, and Animal Spirits? How imagined *Ideas* are imprinted in the Seed? Whence comes the external likeneſs in the *Fœtus*? Whether the *ſemen muliebre* be the formative Cauſe of the *Fœtus*, and the *virile* be only a Ferment to open and put into act the forming Power of the Female Seed? What may be ſaidto the *Harvean* Obſervations concerning the Non-Appearance of the Seed ſoon after the Coit? Further, he conſiders the whole Work of the Formation of the *Fœtus*; and inveſtigates, what is its Power? Whether the Seed be actually animate? Whether a Vegetative Soul be to be admitted in Man; and wherein that conſiſts? Moreover he inquires, Whether the Nutrition of the *Fœtus* is perform'd by the Navil, or the Mouth, or by both? and reſolveth for the laſt; alledging for the Nutrition by the Mouth, among other Arguments, an Obſervation he made of a Child of his own, which about an Hour after it was Born, did void at the Mouth a copious Milk, before it had ſucked or taken in any Thing. Next, he diſcuſſes that great Queſtion, Whether the *Fœtus* reſpireth in the Womb? And reſolves it in the *Negative*; aſſerting on this Occaſion, That a *Fœtus* never cries in the Womb, *&c.*

Paſſing on to the *Middle Venter*, or Cheſt; he there examines the *Breaſts*, and particularly, Whether there be a Communication of their Lacteous Veſſels with any Chyliferous Channel? Whether the Chyle do paſs through the Arteries themſelves to the Breaſts? What Milk is? How it is produced of the Chyle? What impells the Chyle to the Breaſts? Concerning which laſt Queſtion, he declares his Opinion to be, that it is a ſtrong Imagination, and an earneſt and frequent Thought and Deſire of Milk and giving Suck, which works that impulſe; foraſmuch as the vehement Paſſions of the Mind are able to cauſe various Motions of the Spirits and Humours; where the Author taketh Pains to ſhew, how this Cauſe hath place in *Brutes*.

Treating of the *Heart*, he will not admit it to be a *Muſcle*, and endeavours to ſolve the Arguments alledged to prove it to be one. He recites divers memorable Examples of Men wounded in the *Heart*, yet not dying preſently, *&c.*

In the *Lungs*, he conſiders its Structure out of *Malpighius*; obſerves the many odd Things, often found in them, and, among the reſt, Stone of Stone-duſt in the Lungs of a Stone-cutter; aſſigneth them the Office of Reſpiration, to refrigerate and condenſe the Blood, and ſo to make it paſs to the left Venticle of the Heart. Where he contends againſt thoſe, that would have ſome Air mix it ſelf with the Blood, and thoſe alſo that would reject Cooling as the chief Uſe of Reſpiration; and particularly againſt Dr. *Thruſton*, for diſcharging the Heart from the Office of Sanguification, and charging the ſame upon the Lungs. To which he ſubjoyns a *Quære*, *viz.* Whether a Man born can live any Time without Reſpiration? Alledging, divers noble Examples of Men, that have done ſo.

Proceeding to the *Third Venter*, the *Head*, he endeavours to refute the *Carteſian* Opinion about the Origin of the *Brain*; and then, among many other Particulars, animadverts, on thoſe that alledge Inſtances of humane Bodies, that were diſtitute of all Brain, which he is unwilling to believe, ſuſpecting, that it is grounded only upon ſuperficial Inſpection. Which done, he diſputes againſt both the *Carteſian* Uſe of the *Conarion*, and that aſſigned by Dr. *Wharton*; as alſo againſt the Office, aſcribed by Dr. *Willis* to the *Cerebellum*, *viz.* to ſerve for the performing of the Involuntary functions and actions of Animals. After which he Diſcourſes largely of the *Animal Spirits*, attempting to diſprove Dr. *Gliſſon*'s Doctrine about the Matter, whence thoſe Spirits are Generated, and that alſo of *Des-Cartes*, eſteeming them not to differ *Specie* from the *Vital*: Himſelf in the mean time affirming them to be prepared in the Brain, chiefly out of the ſalin and a few ſulphureous Particles of the Blood, and deſign'd not only for the *animal*, but alſo for ſome of the *natural* Actions of the Body, eſpecially the Nutrition of the *ſpermatic* Parts, *&c.*

Paſſing to the *Eye*, he gives the anatome of the ſtructure of this Organ, and the conſideration of the Uſes of every Part thereof. The like he does as to the *Ear*, and the reſt of the Organs of our Senſes. Diſcourſing of the *Tongue*, he will not acknowledge that Part to be a Muſcle, as *Spigelius*, *Bellinus*, and others, take it to be. Speaking of the *Salival Channels*, he takes Notice of the contention riſen between *Blaſius* and *Steno* concerning the priority of their Diſcovery, *&c.*

Having diſpatch'd theſe three Books, and in them the *Three Venters*, he goes on to the remaining ſeven Books, which he diſpatches with more Brevity; treating therein of the *Artus*, the *Muſcles*, with an *Appendix* about the *Membrans* and *Fibres*, the *Arteries*, the *Veins*, the *Nerves* (not allowing of Dr. *Gliſſon*'s Doctrine, that the Nerves convey the nutritious Juice,) the *Bones*, the *Cartilages* and Ligaments, concerning which we cannot here enlarge.

ERRATA, *In* Numb. 104. *p.* 70. *l.* 29. *r.* decay. *In this* Numb. 105. *p.* 90. *l.* 18. *r.* for the annual. *p.* 95. *l.* 14. *r.* The button V. *ib.* *l.* 18. *r*, upon it; b, the Hammer, *p.* 96. *l.* 15. *r.* the hollow place, *y*, in fig. 1. *ib.* *l.* 17. *r.* hole, 1. 2. 3. 4. in fig. 2.

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